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January 1975

Metropolitan Life

Statistical Bulletin

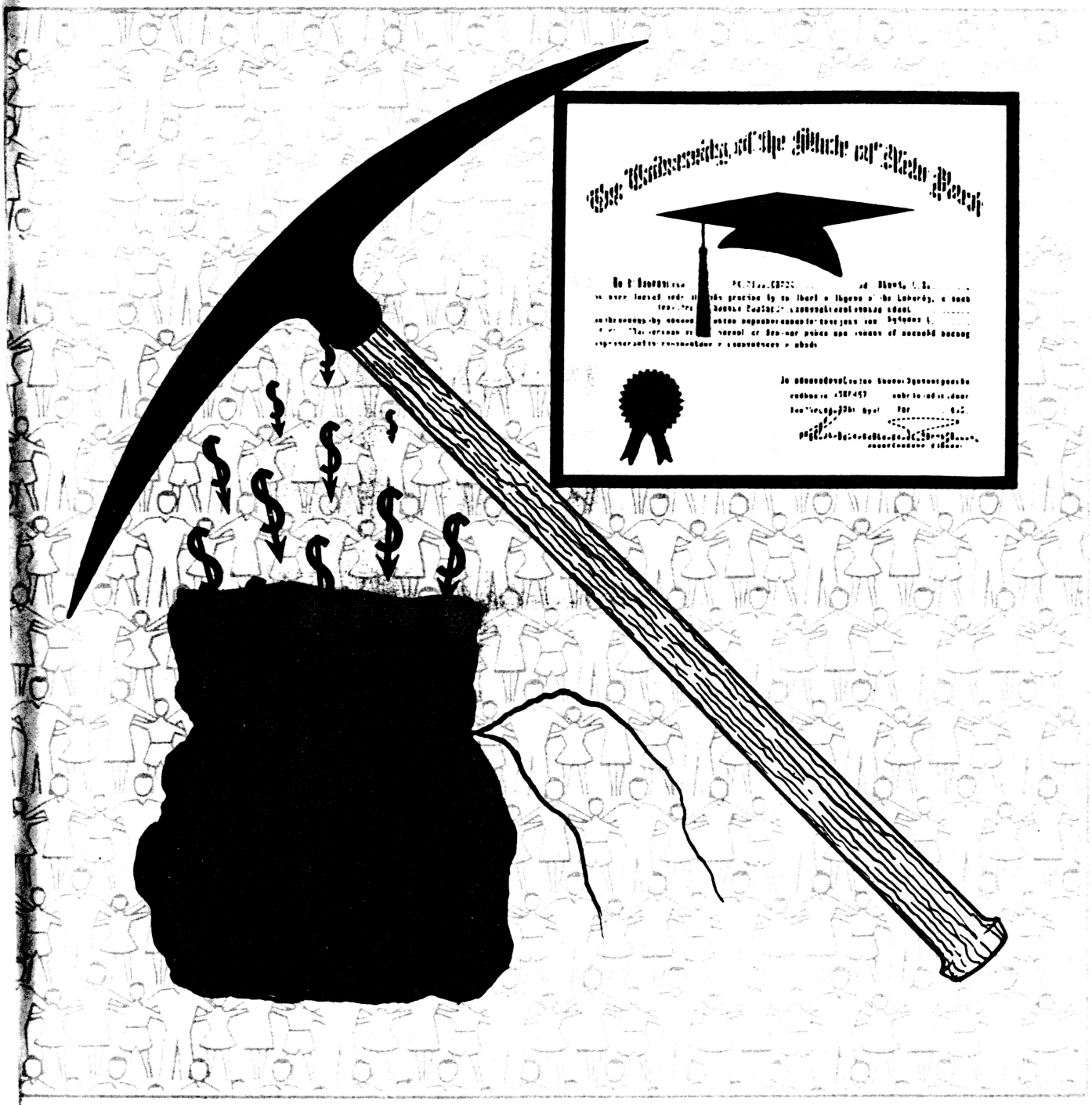

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TABLE 1—MORTALITY RATIOS BY SOCIAL CLASS AND AGE

United States, 1950, and England and Wales, 1959-63

Age	Social Class I	II	III	IV	V
United States, 1950					
Total Males					
20-64	82%	85%	97%	100%	153%
20-24	47	74	73	91	172
25-34	50	71	77	99	214
35-44	66	74	88	103	205
45-54	85	85	96	102	166
55-64	94	91	104	98	126
White Males					
20-64	83	84	96	97	120
20-24	47	72	71	88	131
25-34	50	69	75	91	146
35-44	66	72	86	97	149
45-54	85	83	95	99	130
55-64	94	89	104	97	109
England and Wales, 1959-63					
Total Males					
15-64	76	81	100	103	143
20-24	59	85	90	100	149
25-34	73	72	89	107	181
35-44	69	73	97	104	181
45-54	76	77	100	104	158
55-64	78	84	102	101	134
Married Females					
15-64	77	83	102	105	141
20-24	79	64	97	92	159
25-34	83	76	99	103	163
35-44	75	79	102	106	153
45-54	78	82	102	104	144
55-64	76	85	102	106	136
Single Females					
15-64	83	88	90	108	121
20-24	79	70	72	98	213
25-34	67	56	74	93	145
35-44	82	65	73	97	132
45-54	86	82	86	104	105
55-64	83	99	104	116	119

Source: Department of Health, Education, and Welfare, Public Health Service: Mortality by occupation level and cause of death among men 20 to 64 years of age: United States, 1950. Washington DC, Government Printing Office, 1963; Registrar General for England and Wales: 1961 Occupational Mortality Tables. London, HMSO, 1971.

Socioeconomic Mortality Differentials

Many social and economic factors, in addition to biological and genetic ones, are associated with the health and longevity of a population. Among these are occupation, education, income, life style, availability of medical and public health services, diet, and living environment. Groups with the highest socioeconomic status generally have the lowest mortality. Differentials in mortality by social class may be less apparent, however, in countries where mortality has fallen to very low levels, as in the Netherlands.[1,2] The most common indicators of socioeconomic status—occupation, education, and income—are analyzed here for their effects on mortality patterns.

Data from two major studies of mortality by social class based upon occupational classification are shown in Table 1. The first, a United States study,[3] presented male mortality by occupational level in 1950, while the second, an England and Wales investigation,[4] included both male and female mortality in 1959-63; in the latter study, married women were classified according to their husband's occupation.

Although the classification of occupations into social classes in the two surveys were somewhat different, the patterns of mortality within each were generally similar. In the United States study, Class I—the highest social class—included professional workers, while Class V—the lowest social class—included laborers. Classes II, III, and IV, respectively, covered intermediate occupations such as technical, administrative, and managerial workers; proprietors, clerical, sales and skilled workers; and semiskilled workers.

The mortality ratios (ratios of the death rates in each social class to the death rate for all classes combined) tended to be inversely related to social class. The ratios at the lowest level (Class V) were 1½ to 2 times greater than they were at the highest level (Class I), for all ages combined. At ages 20-24, Class V ratios were more than 2½ times Class I ratios, except among married females in England and Wales where the mortality of the lowest class was about twice that of the highest social class. The differential between these two classes diminished with increasing age, generally falling below 2 to 1 at ages 45-64. At the older ages the factors responsible for increased mortality are not so strongly related to socioeconomic status, and biological and genetic influences increase in importance.[5] The result is a leveling off at the older ages of differences in mortality due to social class.

In the United States study the mortality gradient by social class was affected by the high correlation between race and social class. Among whites, 4 percent were in Class I, 10 percent in Class II, 40 percent in Class III, 24 percent in Class IV, and 8 percent in Class V. The corresponding figures for nonwhites were 0.5 percent, 3 percent, 14 percent, 30 percent, and 31 percent, respectively. Thus, nonwhites were concentrated at the lower end of the social class scale. When nonwhites are excluded from the data, the mortality ratio of Class V is reduced from 153 percent to 120 percent of the mortality ratio of Class I for ages 20-64 combined. (See top two tiers of Table 1.)

TABLE 2—MORTALITY RATIOS BY SALARY CLASS AND AGE

Male Employees of Two Large Companies, 1965-1971

Age Group	Salary Class: High	Middle	Low	Low/High
15-64	68%	73%	89%	1.31
15-34	68	75	108	1.59
35-39	58	66	84	1.45
40-44	64	65	94	1.47
45-49	61	61	79	1.30
50-54	66	78	86	1.30
55-59	79	75	64	1.06
60-64	76	82	94	1.24

Source of basic data: Statistical Bureau of Metropolitan Life Insurance Company.

TABLE 3—MORTALITY RATIOS BY EDUCATIONAL ATTAINMENT

White Males and Females Aged 25-64, 1960

Years of School Completed	Male	Female
College, one or more years	77%	81%
High School, 1-4 years	97	89
Elementary, 8 years	106	108
Less than 8 years of school	115	130

Source: Kitagawa E., Hauser PM: Education differentials in mortality by cause of death: United States, 1960. *Demography* 5:318-353, 1968.

The pattern of mortality by social class among married females in England and Wales followed closely that of their husbands, indicating that it is not only occupation, but life style and living environment as well that account for mortality differentials. (See the third and fourth tiers of Table 1.) This is further confirmed by studies of infant mortality in which the same inverse relationship between social class and mortality was found to favor the higher social classes.[6,7] At ages 15-64 combined, mortality ratios among single women increased steadily from 83 percent in Class I to 121 percent in Class V. (See bottom tier of Table 1.)

Disparities between Class I and Classes II-IV have tended to narrow in recent years; in a few cases the lowest mortality has been found in the intermediate classes. A wide difference remains, however, between Classes I-IV and Class V, which consists of unskilled laborers and their wives.

For many years the Statistical Bureau has maintained mortality records for certain employee groups covered by Metropolitan Group Life insurance. In Table 2 the combined experience among male employees of two large companies in 1965-71 is compared by salary class and age with the mortality of Group Life insurance cer-

tificate holders as tabulated by the Society of Actuaries. Salary class was determined prior to the onset of any disability and, therefore, was not seriously affected by the health status of the employee.

Generally, these employee groups had lower mortality than expected and those in the highest salary class had the lowest mortality. For all ages combined, mortality ratios ranged from 68 percent in the highest salary class, to 73 percent in the middle salary class, and to 89 percent in the lowest salary class. At ages 15-44 the mortality in the lowest salary class was about 1½ times that in the highest salary class and the differential diminished with increase in age. Employees in the middle salary class generally tended to experience mortality closer to that of the highest salary class than to that of the lowest salary class; the mortality of such employees was lower than that for the highest salary class at ages 55-59 and was about the same at ages 40-49.

It should be noted that the level of income is generally related to occupation, the choice of which is influenced by education. Because of the interdependence of these factors, the effect of any one is affected by the presence of others. Also, occupational status and earnings may be lowered as a result of accident, illness, or infirmities of age. Prior to death, men often work at jobs below the level of their usual lifetime occupation, so that income is subject to variation over time. Mortality ratios based on occupation and income differentials may, therefore, be less reliable than those based on educational attainment. The latter is more or less fixed after schooling is completed (usually about age 25).

Table 3 presents mortality ratios by educational attainment from a survey of the white population in the United States at ages 25-64 in 1960.[8] The mortality ratios shown represent the ratio of the mortality in a particular educational group to that for the total population regardless of education. Those with some college education had the lowest mortality while those with less than eight years of schooling had the highest relative mortality. The ratios rose from 77 percent for men with one or more years of college, to 97 percent for men with 1-4 years of high school, to 106 percent for men who had completed eight years of elementary school, and to 115 percent for men with less than eight years of school. The corresponding ratios for females were 81, 89, 108, and 130 percent. Those with the least schooling among both sexes had about 1½ times greater mortality than those with one or more years of college.

With rising standards of living, improved public health systems, and advances in medicine and science, mortality has declined. It has been postulated that further advances may come by providing better access to medical treatment among the socially disadvantaged. However, these data suggest that socioeconomic differences in mortality may persist until the factors that make up a person's life style and living environment and their effect on longevity are better understood.

A future article will examine the effect of socioeconomic factors on mortality for selected causes of death.

[1] *The Determinants and Consequences of Population Trends.* Population Studies, No 50, Dept of Economic and Social Affairs, United Nations, 1973.

[2] Antonovsky A: Social class, life expectancy, and overall mortality. *Milbank Mem Fund Quart 45*:31-73, 1967.

[3] Guralnick L: Mortality by occupation level and cause of death among men 20 to 64 years of age: United States, 1950. *Vital Statistics—Special Reports 53*:439-612, National Vital Statistics Division, 1963.

[4] *Registrar General's Decennial Supplement, England and Wales, 1961:* Occupational Mortality Tables. London, HMSO, 1971.

[5] Redington FM: An exploration into patterns of mortality. *J Inst Actuaries 95*:243-317, 1969.

[6] *Infant and Perinatal Mortality in England and Wales.* Public Health Service Publication No 1000, Ser 3, No 12. National Center for Health Statistics, Dept of Health, Education, and Welfare, 1968.

[7] Benjamin B: Mortality trends in Europe. *World Health Statistics Report 27*:24-39, 1974.

[8] Kitagawa E, Hauser PM: Education differentials in mortality by cause of death: United States, 1960. *Demography 5*:318-353, 1968.

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Vol. 58

Statistical Bulletin

January 1977

Longevity of First Ladies of the United States
Socioeconomic Mortality Differentials by Leading Causes of Death
Accident Death Toll in 1976
Current Patterns of Dependency

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Socioeconomic Mortality Differentials by Leading Causes of Death

Mortality differentials in a population have long been ascribed to biological factors and public health standards and, more recently, to variations in social and economic conditions. Groups with the highest socioeconomic status have generally had the lowest mortality.* An analysis of mortality by *specific causes of death* as affected by such socioeconomic variables as occupation, education, and income is presented in this article.

Once again the data used for mortality by occupational class is based upon a 1950 study of male mortality in the United States,[1] and an investigation of male and female mortality in England and Wales in 1959-63.[2] Although the classification of occupations into groups differed somewhat for the two studies, the characteristics are much the same. Class I, the highest socioeconomic level, includes professional workers. Classes II, III, and IV cover occupations such as technical, administrative, and managerial workers; proprietors, clerical, sales, and skilled workers; and semiskilled workers. Class V includes laborers.

An examination of the ratios of death rates in each occupational class to the death rate for all classes combined (mortality ratios) indicates an inverse relationship by socioeconomic status. The ratios at the lowest level (Class V) were about 1½ to 2 times greater than they were at the highest level (Class I) for all ages and causes of death combined for the four groups shown in Table 1.

In earlier periods infant mortality and deaths from infectious diseases accounted for a good part of the mortality differentials by socioeconomic status. Currently, however, the chronic diseases play a major role. In the United States the mortality among white males in Class V was higher than that of the other classes for each cause of death here considered except diabetes mellitus and arteriosclerotic heart disease. Disparities between Class I and Classes II-IV have tended to narrow in recent years; for more than half the causes of death shown in Table 1 the lowest mortality has been found in the intermediate classes. Nevertheless, a wide difference still remains between Classes I-IV and Class V.

In England and Wales in 1959-63 the experience among males and married females was similar to that among males in the United States, with the highest mortality occurring in Class V and the lowest in Classes I-IV. Among married women, major exceptions occurred in the mortality from breast cancer, cirrhosis of the liver, and suicide. It should be noted that married women were classified by husband's occupation, and their mortality closely paralleled that of their husbands, indicating that life style and living environment account in some degree for mortality differentials.

Mortality ratios among single women in England and Wales followed much the same pattern as that among married women, but with more exceptions for specific causes of death; their experience was based on fewer deaths and is, therefore, less reliable.

Table 2 presents the combined mortality experience by cause of death and salary class in two large companies during the period 1965-71. Salary class was determined prior to onset of any disability and was, therefore, not seriously affected by the health status of the employee. For all ages and causes of death combined, mortality in the lowest salary class was 1.3 times that in the middle and highest salary classes. This relationship held for all the causes of death here considered. For about half the causes of death, however, the lowest mortality was in the middle-income group rather than in the high-income group. The ratio of mortality in the lowest salary group to that for the middle and highest salary group ranged from 1.1 for diseases of the heart to 1.8 for suicide.

Level of income is generally related to occupation, the choice of which is influenced by education. Occupational status and earnings can also be lowered because of accidents, illness, or infirmities of age. Mortality ratios based on income

*See Jan 1975 issue of the *Statistical Bulletin*.

TABLE 1—MORTALITY RATIOS BY CAUSE OF DEATH AND OCCUPATION

White Males, United States, 1950
Males and Females, England and Wales, 1959-63

Cause of Death	Occupational Class I	II	III	IV	V	Occupational Class I	II	III	IV	V
	Male									
	United States Ages 20-64					England and Wales Ages 15-64				
All causes	82%	83%	96%	97%	121%	76%	81%	100%	103%	143%
Tuberculosis	38	40	69	103	158	40	54	96	108	185
Malignant neoplasms—total	89	91	106	104	116	73	80	104	102	139
Lung, bronchus*	81	91	116	115	120	53	72	107	104	148
Diabetes mellitus	98	99	110	88	90	81	103	100	98	122
Cerebrovascular disease	87	79	89	80	94	86	89	101	98	135
Arteriosclerotic heart disease	115	109	116	100	103	98	95	106	96	112
Influenza	57	51	73	95	153	58	67	89	114	162
Pneumonia						48	54	88	102	196
Cirrhosis of the liver	90	88	107	122	158	106	136	86	85	137
Accidents—total	50	68	82	107	173	—	—	—	—	—
Motor vehicle	—	—	—	—	—	72	78	103	107	157
Suicide	90	86	99	102	147	91	94	87	103	184
	Female									
	Married Women England and Wales Ages 15-64					Single Women England and Wales Ages 15-64				
All causes	77%	83%	102%	105%	141%	83%	88%	90%	108%	121%
Tuberculosis	41†	61	102	112	178	122†	50†	71	120	127†
Malignant neoplasms—total	89	92	103	100	124	116	105	109	111	108
Lung, bronchus*	83	89	102	101	131	108†	118	110	106	127†
Breast	111	104	104	96	104	117†	111	118	100	84†
Diabetes mellitus	43†	67	95	121	183	100†	83†	80	114†	173†
Cerebrovascular disease	68	80	104	108	140	82†	98	99	116	96
Arteriosclerotic heart disease	69	81	103	107	143	67†	100	100	117	122
Influenza	46†	74	97	121	171	57†	67†	66	115	123†
Pneumonia	64†	69	95	114	172	39†	47	55	95	152†
Cirrhosis of the liver	94†	132	92	92	115	50†	127†	83†	91†	120†
Accidents—total	—	—	—	—	—	—	—	—	—	—
Motor vehicle	106†	88	89	102	135	145†	103	96	101	248†
Suicide	110	98	101	84	109	132†	104	86	82	160†

*Trachea also included in data for England and Wales.

†Based on less than 20 deaths per annum.

Source: Guralnick L: Mortality by occupation level and cause of death among men 20 to 64 years of age: United States, 1950, *Vital Statistics—Special Reports* 53:439-612, National Vital Statistics Division, 1963; *Registrar General's Decennial Supplement, England and Wales, 1961:* Occupational mortality tables, London, HMSO, 1971.

TABLE 2—MORTALITY RATIOS BY CAUSE OF DEATH AND SALARY CLASS

Male Employees of Two Large Companies, 1965-1971

Cause of Death	Salary Class: Low (1)	Salary Class: Middle or High (2)	Ratio (1)/(2)
All causes	89%	70%	1.3
Malignant neoplasms—total	71	59	1.2
Respiratory system	120	81	1.5
Diabetes mellitus	92	70	1.3
Cerebrovascular disease	98	65	1.5
Diseases of the heart	89	82	1.1
Influenza and pneumonia	87	51	1.7
Accidents—total	176	116	1.5
Motor vehicle	217	133	1.6
Suicide	94	51	1.8

Source: Statistical Bureau of the Metropolitan Life Insurance Company.

TABLE 3—MORTALITY RATIOS BY CAUSE OF DEATH AND EDUCATION

White Population, Ages 25-64
United States, 1960

Cause of Death	Years of School Completed: Less than 8 years		Elementary 8 years		High School 1-4 years		College 1 or more years	
	Male	Female	Male	Female	Male	Female	Male	Female
All causes	115%	130%	106%	108%	97%	89%	77%	81%
Tuberculosis	184	*	119	*	80	*	21	*
Malignant neoplasms—total	109	113	112	105	94	94	83	92
Lung, bronchus	118	123	114	96	95	94	61	90
Breast	—	87	—	98	—	103	—	111
Diabetes mellitus	103	216	80	96	124	62	71	50
Cerebrovascular disease	117	144	102	97	90	89	92	71
Arteriosclerotic heart disease	101	141	101	116	107	84	81	59
Influenza and pneumonia	163	*	106	*	76	*	63	*
Cirrhosis of the liver	96	103	108	93	101	106	94	89
Accidents—total	145	119	116	119	92	90	64	96
Motor vehicle	129	104	118	126	96	89	70	109
Suicide	125	*	128	*	89	*	72	*

*Mortality ratios not computed because number of cases insufficient.

Source: Kitagawa EM, Hauser PM: Education differentials in mortality by cause of death: United States, 1960. *Demography* 5:335-39, 1968.

and occupation may, therefore, be less reliable than those based on educational attainment, which is more or less fixed by about age 25.

Mortality ratios by cause of death and education, based on a survey[3] of the white population in the United States at ages 25-64 in 1960, are shown in Table 3. These mortality ratios relate the mortality in a particular educational group to that for the total population regardless of education. For all causes of death combined, the ratios ranged from 77 percent among men with one or more years of college to 115 percent among men with less than eight years of school, and from 81 percent to 130 percent among women.

For both males and females, those with eight years of education or less had higher mortality than those with more schooling for every cause of death shown, except diabetes mellitus, arteriosclerotic heart disease, and cirrhosis of the liver among men, and breast cancer, cirrhosis of the liver, and motor vehicle accidents among women.

These data suggest that socioeconomic differences in mortality may continue in the future until the factors that make up a person's life style and living environment are better understood. Rising standards of living, improved public health systems, and advances in medicine have reduced overall mortality and morbidity levels but socioeconomic differences still remain.

In a discussion of social class and sickness, Syme and Berkman[4] recommend more comprehensive studies of psycho-social variables that may weaken bodily defenses. This involves an investigation of how people cope with the problems arising from cultural, social, and environmental situations of everyday life and the handling of stressful life events such as job loss or pregnancy.

[1]Guralnick L: Mortality by occupation level and cause of death among men 20 to 64 years of age: United States, 1950. *Vital Statistics—Special Reports* 53:439-612, National Vital Statistics Division, 1963.

[2]*Registrar General's Decennial Supplement, England and Wales, 1961:* Occupational Mortality Tables. London, HMSO, 1971.

[3]Kitagawa E, Hauser PM: Education differentials in mortality by cause of death: United States, 1960. *Demography* 5:318-353, 1968.

[4]Syme SL, Berkman LF: Social class, susceptibility and sickness. *American Journal of Epidemiology* 104:1-8, No. 1, July 1976.

Accident Death Toll in 1976

Deaths from accidents in the United States numbered about 2,000 less in 1976 than in 1975. With an estimated total of 100,500 deaths, the provisional mortality rate from accidents in the year just ended was 46.8 per 100,000 population, a drop of almost 3 percent from the corresponding rate of 48.1 in 1975. This estimated death rate for 1976 is the lowest ever recorded.

The number of fatalities in motor vehicle accidents in 1976 increased by about 500, to an estimated 46,500, or 21.7 per 100,000. This death rate was at about the same level as that recorded in 1974 and 1975. The lower death rates from motor vehicle accidents in the past three years are attributed in large part to the reduced speed limit of 55 miles per hour in effect during the period. Preliminary data indicate that the fatality rate per 100 million miles traveled—which has been declining since 1966—reached a record low of 3.4 in 1976.

Deaths from injuries in and about the home decreased to a low of 24,500, about 1,000 below the figure for the previous year. Public accidents, other than those involving motor vehicles, accounted for 21,500 deaths in 1976, also about 1,000 fewer than in 1975. The number of job-related fatalities declined by about 600 to a record low of 12,000; approximately 3,800 of these deaths are included in the estimated 46,500 motor vehicle fatalities in 1976.

According to records maintained by the Statistical Bureau of the Metropolitan Life Insurance Company, more than 850 persons in the United States lost their lives in catastrophes (accidents taking five or more lives) in 1976. The death toll was somewhat higher than that in 1975, due to a